AMENDMENTS TO THE SPECIFICATION

Please amend paragraphs [0128]-[0134] of the specification (paragraphs [0150]-[0156] of the published application) as follows:

[0128]   In order to highlight the technical character of the present invention, one practical example consist in the ~~sounds~~ sound or vocal recognition and in the image recognition. Devices or apparati provided with artificial intelligence features may have input means responsive to acoustic and/or electromagnetic waves. The above definition is directed to the physical nature of the waves and not to their frequency range, since devices can easily be equipped with sensors or receivers, which are responsive to signals within any frequency range, and among these ranges there is also the acoustic frequency range and the electromagnetic ~~waves~~ wave frequency range, at which the human ear and the human eyes are responsive. In this case a device having artificial intelligence is provided with a processing unit, such as a computer or microprocessor, at least a memory in which a software program is saved, the said program comprising the algorithm or the instructions for carrying out the method according to the invention. A further memory or the same memory for saving the dataset of known variables may be employed. Also input means for the ~~said~~ dataset are provided~~. Furthermore~~, and furthermore the device ~~having~~ has also at least one sensor or more than one sensor responsible to acoustic and/or electromagnetic waves, for example in the optical frequency range as referred to human eyes. The input means can be of any kind such as microphones and wave scanning or sampling units of usual construction, and/or image scanning units such as conventional scanners and/or cameras such as photographic or video cameras and/or input means of image data in the form of an array of digital data obtained by scanning and digitalizing an image. The device can thus be trained ~~in order~~ to recognize sounds and voices relatively to the kind of source that has generated the sound relatively to the owner of the voice and also to recognize the meaning of the sound and or of a vocal expression. Furthermore, the device can be trained in recognizing the shape of an object reflecting or generating electromagnetic waves, the distance and the meaning of the said object, such as the nature or the kind of object or if the identity of the object, such as the identity of the person having a certain face or morphological appearance.

[0129]   In this case a database of known data is prepared by correlating univoquely on one

side the acoustic signals emitted by one or more objects or one or more living beings making part of the typical environment in which the device has to operate, or the data relating to one or more images of one or more objects or one or more living beings making part of the typical environment in which the device has to operate, and ~~to~~ on the other side the kind, and/or the identity and/or the meaning to which the ~~said~~ acoustic signals or image data are related and/or from which the ~~said~~ acoustic signals or image data are generated. It has to be noted that different kinds of noise or ~~disturbs~~ disturbances can affect data, such as acoustic noise due to other sources, like ambient noise and/or different conditions of lighting of the object and/or person when the acoustic and/or image data for the database are generated. Thus the problem of image recognition is not a trivial one.

[0130]   In order to teach the device or apparatus, the program to which ~~the~~ said dataset is fed carries out the method according to the invention in order to optimally train and test the prediction algorithm, which will govern the acoustic and/or image recognition skills of the device. The acoustic and or image recognition processes must be as rapid as possible in order to have the device or apparatus operating rapidly. This is particularly important when a device or apparatus is concerned of the kind called robot or the like which operates in a natural environment, where fast reaction times are normally required.

[0131]   A further example of a system based on the method according to the present invention consists in a specialized system for image pattern recognition having artificial intelligence utilities for analyzing a digitalized image, i.e. an image in the form of a array of image data records, each image data record being related to a zone or point or unitary area or volume of a two or three dimensional visual image, a so called pixel or voxel of a visual image, the ~~said~~ visual image being formed by an array of the ~~said~~ pixels or voxels and utilities for indicating for each image data record a certain quality among a plurality of known qualities of the image data records., ~~the~~ The system ~~having~~ has a processing unit as for example a conventional computer, a memory in which an image pattern recognition algorithm is stored in the form of a software program which can be executed by the processing unit, a memory in which a certain number of predetermined different qualities which the image data records can assume has been stored and which qualities ~~has~~ have to be univoquely associated to each of the image data records of an image data array fed to the system, input means for receiving arrays of digital image data records or input means for generating arrays of digital image data records from an existing image and a memory for storing the ~~said~~ digital image data array,

output means for indicating for each image data record of the image data array a certain quality chosen by the processing unit in carrying out the image pattern recognition algorithm in the form of the ~~said~~ software program. The image pattern recognition algorithm is a prediction algorithm in the form of a software program, which prediction algorithm is further associated to a system being further provided with a training and testing software program. The system is able to carry out training and testing according to the method of the present invention. This method is provided in the system in the form of the training and testing software program, a database being also provided in which data records are contained univoquely associating known image data records of known image data arrays with the corresponding known quality from a certain number of predetermined different qualities which the image data records can assume.

[0132]   In the different examples of ~~system~~ systems described above, in alternative to or in combination with the method for optimizing the training and testing of the prediction algorithm according to the present invention which is in the form of a software program, the above described method for carrying out an independent variable selection of the data records in the database for training and testing can be carried out in this case also ~~this method phase~~ is in the form of a software program stored in a memory of the system and ~~being~~ executable by the processing unit.

[0133]   ~~Form~~From a general point of view the system according to the invention comprises an apparatus or device for generating an action of response which is autonomously, i.e. by itself, chosen among a certain number of different kinds of actions of response stored in a memory of the apparatus or autonomously generated by the apparatus basing the said choice of the kind of action of response on the interpretation of data collected autonomously by means of one or more sensors responsive to physical entities or which are fed to the apparatus by means of input means, ~~the~~ said interpretation being made by means of a prediction algorithm in the form of a software saved in a memory of the ~~said~~ apparatus and being carried out by a central processing unit. The apparatus ~~being~~ is further provided with means for carrying out a training and testing phase of the prediction algorithm by inputting to the ~~said~~ prediction algorithm data of a known database in which input variables of the input data representing the physical entities able to being sensed by the apparatus through the one or more sensors and/or able to be fed to the apparatus by means of the input means are univoquely correlated to at least one definite kind of action of response among the different kinds of possible action of response, the ~~said~~ means for carrying out the training an testing being in the form of a training and testing

software saved in a memory of the apparatus. According to the invention, the ~~said~~ software program corresponds to the method of the present invention according to one or more combinations and sub combinations of steps previously described which method is in the form of a software program or instructions.

[0134]   Figure 9 illustrates schematically an apparatus of the kind disclosed above. The apparatus has a central processing unit 10, such as a CPU or a conventional computer system. Signals corresponding to physical effects such as sound, electromagnetic waves or other kind of effects are generated by sensors 11 which are designed to be responsive to such physical effects or events. The apparatus is expected to output a certain response action chosen autonomously on the basis of the signals sensed by the sensors 11. The response actions are carried out by one or more response action actuators 12 which can be means for carrying out mechanical actions and/or means for generating ~~acustic~~ acoustic or visual signals ~~and(or~~and/or means for transmitting or ~~receving~~ receiving signals or means for carrying out any other action. The ~~kind~~ kinds of action are chosen by means of an artificial intelligence algorithm such as a prediction algorithm or a genetic algorithm or other actually known algorithms which is stored in the form of a software program in a memory 13 or in a memory area of a memory. The different response actions are stored in a memory 14 or in a memory area from which the corresponding software program for carrying out the actions can be retrieved by the processing unit or alternatively the different actions can be generated by the processing unit 10 in carrying out a response action generator algorithm in the form of a software program stored in a memory 15 or in another memory area. The artificial intelligence algorithm, ~~as~~ for example a prediction algorithm, has to be initialized by teaching and testing procedures. In a memory 16 or in a memory area a Training and Testing database is provided. The Training and testing database can be also inputted by means of input devices such as a storage media reader in which a storage media is inserted, on which the ~~said~~ training ~~an~~ a testing database is stored. The database is submitted alternatively or in combination and in whichever order of sequence to an ~~optimisation~~optimization of the distribution of the database records onto a training and a testing database by means of [[a]]an algorithm in the form of a software program, which operates according to the method of the present invention. The software program is stored in a memory or in a memory ~~are~~ area 17 and is retrieved there-from and carried out by the central processing unit 10. Similarly also the input selection option is in the form of a software program stored in a memory or in a memory area 18. The central unit can access also this software program and carry out the same for executing an input variable selection on the different independent

variables of the training and testing database records. Finally, the input data sensed by the sensors and the ~~carried out~~ <u>performed</u> specific response action can be stored in a memory or in a memory area 19 in the form of a database of experience. This database can also include reactions of the environment to the response action carried out which can be associated to a value in order to have also a measure of the success of the response action autonomously chosen and carried out by the apparatus.